

SEPTIC SYSTEM BOX PIPE SEAL

[0001] This application claims the benefit of U.S. Provisional Application No. 60/431,390, filed December 7, 2002.

BACKGROUND OF THE INVENTION

[0002] Field of the Invention

[0003] The invention pertains to pipe seals for septic system liquid distribution boxes or drop boxes, more particularly to a field-installable and removable pipe seal for a plastic drop box.

[0004] Description of the Prior Art

[0005] Septic system box seals for receiving septic system pipes through a wall of the box are mounted sealingly to the wall in a hole through the wall.

[0006] One method for mounting the seal sealingly to the wall comprises casting an annular radially extending ring about the seal into the wall of the box around the hole.

[0007] Another method for mounting the seal sealingly to the wall comprises fusing an annular radially extending portion of the seal to the wall after the wall and hole in the wall is formed.

SUMMARY OF THE INVENTION

[0008] It is one object of the invention to provide a seal that is adjustable for receiving different

diameter septic system pipes by tearing out a portion of the seal, the seal otherwise sealing a hole through a wall of a septic system drop box in which the seal is mounted.

[0009] It is another object of the invention that the seal resiliently double seals on one side of the wall through which the seal extends.

[0010] It is another object of the invention that the seal is mounted in the hole in the wall by screwing a ring on a cylindrical portion of the seal that extends through the wall.

[0011] It is another object that the seal can be field installed in a hole in a drop box wall by hand.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] In order that the invention be more fully comprehended, it will now be described, by way of example, with reference to the accompanying drawings, in which:

[0013] FIG. 1 is a schematic cross section side view of a septic system plastic drop box including a septic system distribution pipe extending sealingly through a seal removably mounted sealingly in a hole through a wall of the box, according to the invention.

[0014] Fig. 2 is a front view of a threaded ring of the invention.

[0015] Fig. 3 is a side view, front facing down, of the threaded ring of Fig. 2

[0016] Fig. 4 is a front perspective view of the threaded ring of Fig. 2.

[0017] Fig. 5 is a cross section side view of the threaded ring of Fig. 2 taken along 5-5.

[0018] Fig. 6 is a front view of a seal plate of the invention.

[0019] Fig. 7 is a side view, front facing down, of the plate of Fig. 6.

[0020] Fig. 8 is a cross section side view of the plate of Fig. 6 taken along 8-8.

[0021] Fig. 9 is a perspective front view of the plate of Fig. 6.

[0022] Fig. 10 is a back perspective view of the plate of Fig. 6.

[0023] Fig. 11 is a front view of the threaded ring of Fig. 2, screwed onto the seal plate of Fig. 6.

[0024] Fig. 12 is a side view, front facing down, of the ring and plate of Fig. 11.

[0025] Fig. 13 is a cross section side view of the ring and plate of Fig. 11 taken along 13-13.

[0026] Fig. 14 is a front perspective view of the ring and plate of Fig. 11.

[0027] Fig. 15 is a cross section enlarged partial view of the ring and plate of Fig. 11 taken at 15a, as shown in Fig. 13.

[0028] Fig. 16 is a cross section enlarged partial view of the ring and plate of Fig. 11 tightened on a wall of a drop box.

[0029] A septic system fluid distribution box seal assembly includes a fluid distribution box comprising a first wall having a first side and a second side, a first opening through the first wall for receiving a septic system pipe through the first opening, a one piece flexible plastic plate comprising tear out means for receiving a pipe through the plate sealingly around the pipe, a

cylindrical outside threaded portion of the plate extending through the first opening, a flange portion of the plate extending radially from the plate comprising a first annular axially facing surface facing the first side, a ring comprising a second annular radially extending axially facing surface and an internal thread, screwed onto the external thread of the cylindrical portion so that the second annular surface faces the second side, a first annular axially extending ridge on the first annular surface radially spaced from a second annular axially extending ridge on the first annular surface, the flange being resilient and angled toward the ring so that the flange is bent axially away from the external threads by the front of the wall when the ring is screwed toward the flange clamping the first wall between the ring and the first and second ridges.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0030] Before explaining the invention in detail, it is to be understood that the invention is not limited in its application to the detail of construction and arrangement of parts illustrated in the drawings since the invention is capable of other embodiments and of being practiced or carried out in various ways. It is also to be understood that the phraseology or terminology employed is for the purpose of description only and not of limitation.

[0031] U.S. Provisional Application No. 60/431,390, filed 12/07/2002 is hereby incorporated by reference in its entirety.

[0032] Referring to the drawings, seal 30 is mounted on wall 34 of drop box 38. Threads 40 have a smaller outer diameter 42 than inner diameter 44 of opening 50 through wall 34.

[0033] Ring 54 is screwed by threads 60 onto threads 40 of plate 58 until wall 34 is sealingly, clamped between radially extending annular surface 62 of the ring and radially extending annular flange 64 of plate 58. Preferably surface 62 bears on the outer face 66 of wall 34 and flange 64 bears on inner face 68 of wall 34.

[0034] Preferably surface 62 is perpendicular 72 to axis 76 of seal 30.

[0035] Annular surface 80 angles toward surface 62 as surface 80 extends away from axis 76 so that portion 82 is closer to surface 62 than portion 84 when ring 54 is screwed on plate 58 before ring 54 is screwed on tightly to sealingly tighten the seal on wall 34.

[0036] Portion 82 includes radially spaced apart 88 annular axially extending ridges 92 and 94. Ridge 92, being distal from ridge 94 compared to axis 76.

[0037] Preferably the height of ridge 92 is the same as ridge 94 so that ridge 92, is closer to surface 62 than ridge 94.

[0038] In Fig. 16, seal 30 is sealingly mounted on wall 34. Ring 54 is screwed onto plate 58, clamping wall 34 between surfaces 62 and 80. Ring 54 is screwed toward flange 64 far enough so that flange 64 bends 98, bringing each of annular ridges 92 and 94 into liquid tight sealing contact with wall 34.

[0039] Ring 54 is preferably made of a rigid material, preferably one piece, plastic.

[0040] Plate 58 is preferably molded in one piece, made of a plastic, flexible enough so that flange 64 can bend as described above to seal ridges 94 and 92 against a wall of a septic tank plastic drop box. Plastic drop boxes used in septic systems are generally made of a tough plastic that is rigid so that the boxes can withstand the crushing force of earth in which they are buried.

[0041] Hand grip ridges 100 on ring 54 provide sufficient grip for hand tightening of the ring enough to bring ridges 92 and 94 into contact with wall 34. This combination of hand-grip ridges, plurality of ridges 92 and 94 and axially flexible axially angled flange that springs axially, urging first the primary sealing ridge 92, and then the secondary sealing ridge 94 against the wall as the ring is tightened makes the seal water tight, easy to install sealingly on the drop box in the

field when a septic system is being installed, and easy to remove in the field.

[0042] Although the above same size ridges and contact order is preferred, the ridges may be of different heights so that they contact the wall simultaneously or in opposite order.

[0043] Weakened annular narrow rings 102, 104 and 106 circumscribe portions 112, 114, and 116 respectively of plate 58 that can be torn out of the plate to leave openings for receiving septic system pipe of different diameters. In order to prevent damage to the inner diameter pipe-sealing edge of an opening that is left by tearing out a portion 112, 114, or 116 by starting with a penetrating tool in the weakened annular ring, a divergent portion 122, 124, or 126 is pushed out of the disc by any convenient tool and then pulled in the manner of a tab to tear out the annular section. Tearing out of weakened annular rings is described in Norman W. Gavin's U.S. Patents Nos. 4,805,920 patented 02/21/89 and 5,882,014 patented 03/16/1999.

[0044] A seal made according to the invention was tightened in an opening through a drop box and tested for leakage. No liquid leakage occurred between the seal and the drop box wall. The drop box was made of HDPE (high density polyethylene). The seal ring was made of LLDPE (linear low density polyethylene). The seal plate was made of polypropylene .

[0045] Other materials may be used so long as flexibility of the angled flange is provided.

[0046] Although the invention has been described in terms of specific preferred embodiments, it will be obvious to one skilled in the art that various modifications and substitutions are contemplated by the invention disclosed herein and that all such modifications and substitutions are included within the scope of the invention as defined in the appended claims.

What is claimed is:

Drawing designators (informal list)

- 30 seal
- 34 wall
- 38 drop box
- 40 threads
- 42 outer diameter
- 44 inner diameter
- 50 opening
- 54 ring
- 58 plate
- 60 threads
- 62 annular surface
- 64 annular flange
- 66 outer face of wall 34
- 68 inner face of wall 34
- 72 perpendicular
- 76 axis
- 80 annular surface
- 82 portion
- 84 portion
- 88 spaced apart
- 92 ridge
- 94 ridge
- 98 bends
- 100 ridges, hand grip
- 102 weakened narrow annular ring
- 104 weakened narrow annular ring
- 106 weakened narrow annular ring

112 portion

114 portion

116 portion

122 divergent portion

124 divergent portion

126 divergent portion